

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Doug Billings et al.

Application No.: 09/740,733

Confirmation No.: 4191

Filed: December 19, 2000

Art Unit: 2176

For: AUTOMATIC ASSIGNMENT OF FIELD
LABELS

Examiner: R. Singh

APPEAL BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

As required under § 41.37(a), this brief is filed within two months of the Notice of Appeal filed in this case on June 8, 2007, and is in furtherance of said Notice of Appeal.

The fees required under § 41.20(b)(2) are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains items under the following headings as required by 37 C.F.R. § 41.37 and M.P.E.P. § 1205.2:

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I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

International Business Machines Corporation

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 30 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 0
2. Claims withdrawn from consideration but not canceled: 0
3. Claims pending: 1-30
4. Claims allowed: 0
5. Claims rejected: 1-30

C. Claims On Appeal

The claims on appeal are claims 1-30

IV. STATUS OF AMENDMENTS

Applicant did not file an Amendment After Final Rejection.

V. SUMMARY OF CLAIMED SUBJECT MATTER

One aspect of Appellant's invention, as recited in independent claim 1, provides a method for processing a document that includes a plurality of fields with respective contents filled into the fields. A document of this sort is shown in Fig. 1. The method includes the following steps:

(a) Labels are provided, to be assigned respectively to the fields, along with one or more rules applicable to the filled-in contents of the fields according to the assigned labels. This step is described in the specification on page 2, lines 24-28, and on page 8, lines 26-29. Detailed examples of labels and associated rules are presented on page 10, lines 1-20.

(b) The contents that have been filled into the fields are machine-read, as shown at step 38 in Fig. 2.

(c) The labels are machine-assigned to the fields by testing the contents of the fields against the rules, in order to find an assignment of the labels to the fields that satisfies the rules. This step is literally supported in the specification on page 2, line 29 – page 3, line 2. The functions of assigning labels and testing field contents against rules are shown in steps 46 and 48 in Fig. 2, and continue in the succeeding steps in this figure.

(d) The contents, identified by the labels assigned to the fields, are extracted and arranged in a database record, shown as element 34 in Fig. 1, as described in the specification on page 8, line 29 – page 9, line 2.

Independent claim 13 recites apparatus for processing a document that includes a plurality of fields with respective contents filled into the fields. The apparatus 20 and document 22 are shown in Fig. 1. The apparatus includes a document processor, also shown as element 30 in Fig. 1 and described in the specification on page 8, lines 16-19. The document processor receives a listing of labels to be assigned respectively to the fields and one or more rules applicable to the filled-in contents of the fields according to the labels assigned thereto, as described in the specification on page 2, lines 24-28, and on page 8, lines 26-29. The document processor reads the respective contents that have been filled into the fields and assigns the labels to the fields by testing the contents of the fields against the rules in order to find an assignment of the labels to the fields

that satisfies the rules, as shown as steps 38-48 in Fig. 2. It then extracts and arranges the contents in a database record, in which the contents of the fields are identified by the assigned labels as described in the specification on page 8, line 29 – page 9, line 2.

Independent claim 25 recites a computer software product, comprising a computer-readable medium containing software instructions that cause a computer to carry out functions similar to the method of claim 1. Embodiment of the present invention in such software is described in the specification on page 9, lines 3-10. The explanation of claims 1 and 13 given above shows the support in the specification for the functions that are recited in claim 25.

Independent claim 26 recites a method for computerized data processing, including the following steps:

(a) Information that has been filled into fields in a form on a computer is received. Receipt of information from electronic forms of this sort is described in the specification on page 8, lines 22-26, and page 11, lines 20-23, and is shown in step 38 of Fig. 2.

(b) Labels are provided, to be assigned respectively to the fields, along with one or more geometrical rules indicating an expected geometrical relationship between two or more of the filled-in fields according to the assigned labels. This step is described in the specification on page 2, lines 24-28, and on page 8, lines 26-29. Geometrical rules are described specifically on page 3, lines 2-5, and page 10, lines 22-27.

(c) The labels are assigned to the fields by testing the information in the fields against the rules, in order to find an assignment of the labels to the fields that satisfies the rules. This step is literally supported in the specification on page 2, line 29 – page 3, line 2. The functions of assigning labels and testing information against rules are shown in steps 46 and 48 in Fig. 2, and continue in the succeeding steps in this figure.

(d) The information, identified by the labels assigned to the fields, is extracted and arranged in a database record, shown as element 34 in Fig. 1, as described in the specification on page 8, line 29 – page 9, line 2.

Independent claim 28 recites apparatus for data processing that includes a form processor, which is arranged to receive information that has been filled into a plurality of fields in a form on a computer. The apparatus 20, including processor 30, is shown in Fig. 1 and described in

the specification on page 8, lines 16-19. The processor receives a listing of labels to be assigned respectively to the fields and one or more geometrical rules indicating an expected geometrical relationship between two or more of the filled-in fields in the form according to the labels assigned to the fields, as described in the specification on page 2, lines 24-28, and on page 8, lines 26-29. As noted above, geometrical rules are described specifically on page 3, lines 2-5, and page 10, lines 22-27. The processor assigns the labels to the fields by testing the information in the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules, as described in the specification on page 2, line 29 – page 3, line 2, and shown in steps 46 and 48 in Fig. 2. It then extracts and arranges the information in a database record, in which the information that has been filled into the fields is identified by the assigned labels, as described in the specification on page 8, line 29 – page 9, line 2.

Independent claim 29 recites a computer software product, comprising a computer-readable medium containing software instructions that cause a computer to carry out functions similar to the method of claim 26. Embodiment of the present invention in such software is described in the specification on page 9, lines 3-10. The explanation of claims 26 and 28 given above shows the support in the specification for the functions that are recited in claim 29.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-3, 6-10, 13-15, 18-22 and 25-30 were rejected under 35 U.S.C. 103(a) over Rawat et al. (U.S. Patent 6,662,340) in view of Lee et al. (U.S. Patent 6,535,883). Claims 4, 5, 16 and 17 were rejected under 35 U.S.C. 103(a) over Rawat in view of Hetherington (U.S. Patent Application Publication 2002/0010714). Claims 11, 12, 23 and 24 were rejected under 35 U.S.C. 103(a) over Rawat in view of Gupta et al. (U.S. Patent 6,199,079). Appellant believes these rejections should be reversed

VII. ARGUMENT

I. The Section 103(a) Rejection of Independent Claims 1, 13 and 25

Appellant respectfully submits that the Examiner erred in maintaining that claims 1, 13 and 25 are obvious over Rawat in view of Lee.

Claim 1 in the present patent application recites a method for processing a document that includes fields, with respective contents filled into the fields. Labels are also provided for the fields, as are rules applicable to the filled-in contents, according to the assigned labels.

In computerized document processing systems that were known in the art, such as those described by Rawat and Lee, the sequence of steps in processing a document in this sort of context would have been as follows:

1. The computer determines which label belongs to each field.
2. The computer reads out the contents of the fields, and associates the contents with the labels (for example, the text filled into the name field is associated with the label NAME, the address text with ADDRESS, and so forth).
3. Once the field contents have been read out and associated with the appropriate labels, the rules can be applied to check that the contents are correct (for example, that the number filled into the ZIP field must contain five or nine digits).

Rawat and Lee follow exactly this model. Rawat describes a “client-side form filler,” which automatically fills out fields of forms in a document. For this purpose, a software application examines label text on the form, and uses the label to map the user data to the appropriate form field (abstract). Thus, Rawat is faithful to the conventional paradigm of first assigning a label, and then processing field contents (in this case, filling in the field contents) based on the label. Rawat also describes methods for labeling unlabeled fields based on context, visual cues, and the form’s underlying markup code (abstract), but nowhere does he depart from the conventional paradigm: the field label must always be determined before the contents can be filled in.

Lee describes a system and method for creating validation rules for confirming input data. Validation rules are associated with corresponding field names and are used to test the contents of each field entered by the user to ensure that the field is filled out correctly (col. 2, lines 30-35). In other words, Lee assumes that the field name (label) that is assigned to a given field is known, and on this basis applies the appropriate rules to validate the contents of that field.

The method of claim 1 takes the diametrically opposite approach: The labels are assigned to the fields “by testing the contents of the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules.” In other words, rather than using the labels to decide how to handle the field contents, as in systems known in the art, the field contents themselves are used, together with the rules, in determining the labels that are to be assigned to the fields. The contents serve as the reference for the labels, in direct opposition to the conventional paradigm in which the labels serve as the reference for the field contents.

There is nothing in the prior art that would have suggested this paradigm switch. In reply to this point in the Response to Arguments in the Official Action (page 9), the Examiner gave no more than the conclusory statement that “The **combination** of Rawat and Lee teaches the feature of assigning the labels to fields responsive to the application of the rules of the content” (emphasis in original), without any indication of where or how this teaching might be found in either of the references. Similarly, in the detailed grounds of rejection of claim 1 (starting at the last line on page 3), the Examiner alleged that a person of ordinary skill would have been motivated to combine the teachings of Rawat and Lee because “in assigning rules to all the fields of the document to determine whether the filled-in content is accurate, the system is able to determine what type of information/data is contain within the field and thus assign a label appropriately.” This rationale is no more than a hindsight restatement of the result of claim 1, with no rational basis in the prior art.

MPEP 2143.03 makes clear that: “To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).” The Examiner has failed to meet this burden. Although the recent Supreme Court decision in *KSR International Co. v. Teleflex Inc. et al*, 550 U.S. ___ (2007) has relaxed the “TSM” test for combining references, it made no change in the requirement that all claim limitations must be taught or suggested by the prior art. The Supreme Court noted with approval *In re Kahn*, 441 F. 3d 977, 988 (CA Fed. 2006), which stated that “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”

As explained above, the method of claim 1 turns previous methods of document processing on their head, by using contents and rules to assign labels, rather than using labels and rules to test contents. The Examiner has given nothing more than conclusory statements, without articulated reasoning or rational underpinning, to support his finding that the present method is obvious. Claim 1 is clearly patentable over the cited art.

Independent claims 13 and 25 respectively recite apparatus and a computer software product that operate on principles similar to the method of claim 1. These independent claims are therefore believed to be patentable over the cited art for the reasons explained above.

Therefore, the rejection of claims 1, 13 and 25 should be reversed.

II. The Section 103(a) Rejection of Independent Claims 26, 28 and 29

Appellant respectfully submits that the Examiner erred in maintaining that claims 26, 28 and 29 are obvious over Rawat in view of Lee.

Claim 26 recites a method for computerized data processing in which, as in claim 1, labels are assigned to the fields in a form “by testing the information in the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules.” Thus, claim 26 recites the same sort of paradigm switch as claim 1, and is therefore patentable over the cited art for the reasons explained above.

Furthermore, claim 26 includes the added feature that the rules in question are “geometrical rules indicating an expected geometrical relationship between two or more of the filled-in fields in the form according to the labels assigned to the fields.” The cited references neither teach nor suggest this sort of geometrical rules. The Examiner rejected claim 26 on the same grounds as claim 1, without relating to the geometrical feature of the rules recited in claim 26. Therefore, on this basis alone, the rejection of claim 26 should be reversed.

In relation to claims 28 and 29 (which recite apparatus and a computer software product that operate on principles similar to the method of claim 26), the Examiner maintained that these claims are obvious for the same reason as claim 6. In rejecting claim 6, the Examiner referred to col. 10, lines 45-55, in Rawat, as allegedly teaching the use of geometrical rules. The cited passage,

however, relates merely to assigning field labels by mapping fields sequentially, according to context. It says nothing about geometry.

Moreover, Rawat was filed May 30, 2002, after the present patent application, as a continuation-in-part of U.S. Patent Application 09/561,449 (now U.S. Patent 6,981,028). Therefore, Rawat is effective as prior art against the claims in the present patent application only to the extent that the '028 Patent discloses the cited subject matter. As noted in MPEP 706.02(f)(1)(B): "The 35 U.S.C. 102(e) date of a reference... is its earliest effective U.S. filing date, taking into consideration any proper benefit claims to prior U.S. applications under 35 U.S.C. 119(e) or 120 if the prior application(s) properly supports the subject matter used to make the rejection" (emphasis added). The same criterion applies to 102(e) references that are used in rejections under 35 U.S.C. 103(a), such as Rawat. In other words, any disclosure made by Rawat that does not also appear in U.S. Patent 6,981,028 is ineffective as prior art against the present patent application.

The '028 Patent describes a method for "mapping" forms to determine their structure and the fields they contain (col. 12, lines 24-37). The forms are defined by HTML code, and the "structure" in the '028 Patent refers to a data structure, not geometrical structure. The '028 Patent says nothing about geometry, nor does it provide support for the method of using field context or sequence in assigning labels that Rawat describes in the passage (col. 10, lines 45-55) cited by the Examiner. Therefore, this passage in Rawat is ineffective as prior art against the claims in the present patent application.

Thus, to summarize, claims 26, 28 and 29 are patentable over the cited art for at least three reasons:

1. The cited references do not teach or suggest assigning labels to fields by testing the information in the fields against the rules, as explained above in regard to claims 1, 13 and 25.
2. The cited references do not teach or suggest the use of geometrical rules that is recited in claims 26, 28 and 29
3. The passage in Rawat that was alleged by the Examiner to teach such rules is ineffective as prior art against the present patent application.

The rejection of claims 26, 28 and 29 should thus be reversed.

III. The Section 103(a) Rejection of Claims 3 and 15

Appellant respectfully submits that even if independent claims 1 and 13 were conceded to be unpatentable over Rawat in view of Lee, the cited references still do not teach or suggest the added elements of dependent claims 3 and 15.

Claims 3 and 15 depend respectively from claims 1 and 13 and add that the rules applicable to the filled-in contents of the fields comprise a relation between the contents of two or more of the fields. The Examiner alleged that these claims are obvious in view of Rawat's disclosure (col. 10, lines 45-55) that "if a field lacks a label, the system identifies the mapping of at least one field preceding a current field" in order to map the current field. As explained above in reference to claims 26, 28 and 29, however, the cited passage in Rawat is not supported by the '028 Patent. Therefore, this passage is ineffective as prior art against the present patent application.

Furthermore, even if it were conceded, for the sake of argument, that the cited passage is supported by the '028 Patent, this passage relates only to the fields and their labels. It says nothing at all about a relation between field contents, as recited in claims 3 and 15. As explained above in regard to claims 1, 13 and 25, field labels and field contents serve very different purposes in processing of forms, and the fact that there may be a sequential relationship between labels of certain fields says nothing about how the contents are related.

Therefore, claims 3 and 15 are independently patentable over the cited art, notwithstanding the patentability of independent claims 1 and 13.

IV. The Section 103(a) Rejection of Claims 4 and 16

Appellant respectfully submits that even if claims 1, 3, 13 and 15 were conceded to be unpatentable over the cited art, the cited references still do not teach or suggest the added elements of dependent claims 4 and 16. These claims depend respectively from claims 3 and 15, and recite that the relation between the field contents that is used in assigning labels to the fields is a mathematical relationship between the numbers contained in two or more of the fields.

Claims 4 and 16 were rejected under 35 U.S.C. 103(a) over Rawat in view of Hetherington, without reference to Lee. Hetherington describes a method for processing free-format data, which is said to obviate the need for provision of separate database fields for each element of the information (abstract). Although Hetherington describes certain uses of rules, they cannot possibly be “applicable to the filled in contents of the fields,” as recited in claims 1 and 13 of the present patent application, since Hetherington is explicitly concerned only with free-format data. Furthermore, the Examiner conceded that “Rawat does not teach one or more rules applicable to the filled-in contents of the fields...” (page 3, lines 5-7 in the Official Action). Therefore, the cited references fail to teach or suggest all of the elements of claims 4 and 16, when these claims are read together with the base claims from which they depend.

Furthermore, even if Lee were to be considered together with Rawat and Hetherington, the three references together still would not have led a person of ordinary skill in the art to use a mathematical relation in the manner recited in claims 4 and 16. Hetherington contains no teaching or suggestion of any sort of mathematical relation. Hetherington refers only to semantic and syntactic information. The boilerplate recitation cited by the Examiner (paragraph 0370: “It will be appreciated by persons skilled in the art that numerous variations and/or modifications may be made to the invention as shown in the specific embodiments without departing from the spirit or scope of the invention...”) can hardly be taken as a suggestion to use mathematical rules in a relationship between numbers in different fields of a form when there is no hint of mathematical rules in the cited reference.

Therefore, claims 4 and 16 are independently patentable over the cited art, notwithstanding the patentability of claims 1, 3, 13 and 15.

V. The Section 103(a) Rejection of Claims 5 and 17

Appellant respectfully submits that even if claims 1, 3, 13 and 15 were conceded to be unpatentable over the cited art, the cited references still do not teach or suggest the added elements of dependent claims 5 and 17. These claims depend respectively from claims 3 and 15, and recite that the relation between the field contents that is used in assigning labels to the fields is a semantic relationship between words formed by characters in two or more of the fields.

Claims 5 and 17 were rejected under 35 U.S.C. 103(a) over Rawat in view of Hetherington, without reference to Lee. As explained above in regard to claims 4 and 16, the cited references fail to teach or suggest all of the elements of claims 5 and 17, when these claims are read together with the base claims from which they depend.

Furthermore, even if Lee were to be considered together with Rawat and Hetherington, the three references together still would not have led a person of ordinary skill in the art to use a semantic relation in the manner recited in claims 5 and 17. As noted by the Examiner (page 6 in the Official Action), Hetherington examines the content and relationships between elements of data in order to determine semantic and syntactic attributes of the data. These semantic and syntactic attributes are then used in answering queries and/or accessing the data (see page 17, claim 1, for example). Hetherington does not refer to semantic relationships between words or to rules of any sort, and he explicitly states that his teachings are applicable to free-format data, rather than fields (abstract). Therefore, Hetherington could not possibly have led a person of ordinary skill to make any sort of use of rules regarding semantic relationships between words in fields of a form, let alone the specific use that is recited in claims 5 and 17.

Therefore, claims 5 and 17 are independently patentable over the cited art, notwithstanding the patentability of claims 1, 3, 13 and 15.

VI. The Section 103(a) Rejection of Claims 6 and 18

Appellant respectfully submits that even if independent claims 1 and 13 were conceded to be unpatentable over Rawat in view of Lee, the cited references still do not teach or suggest the added elements of dependent claims 6 and 18.

Claims 6 and 18 depend respectively from claims 1 and 13 and add the steps of providing one or more geometrical rules indicating an expected geometrical relationship between two or more of the fields, and applying these rules along with the rules applicable to the field contents in assigning the labels. The Examiner alleged that these claims are obvious in view of Rawat's disclosure in col. 10, lines 45-55 – the same passage as was cited against claims 28 and 29. As explained above in reference to claims 26, 28 and 29, however, the cited passage in Rawat is not

supported by the '028 Patent. Therefore, this passage is ineffective as prior art against the present patent application.

Furthermore, even if it were conceded, for the sake of argument, that the cited passage is supported by the '028 Patent, this passage relates merely to assigning field labels by mapping fields sequentially, according to context. It says nothing about geometry.

Therefore, claims 6 and 18 are independently patentable over the cited art, notwithstanding the patentability of independent claims 1 and 13.

VII. The Section 103(a) Rejection of Claims 7 and 19

Appellant respectfully submits that even if independent claims 1 and 13 were conceded to be unpatentable over Rawat in view of Lee, the cited references still do not teach or suggest the added elements of dependent claims 7 and 19.

Claims 7 and 19 depend respectively from claims 1 and 13 and recite that in assigning the labels to the fields, a test assignment is made, and is then rejected if the contents of the assigned fields do not satisfy the rules. In rejecting claims 7 and 19, the Examiner made reference to col. 7, lines 1-35, in Rawat. There is no mention or suggestion in the cited passage, or anywhere else in Rawat, of making or rejecting a test assignment. The Examiner stated (page 4, last paragraph, in the Official Action) that the dictionary could provide multiple label options, but even if this speculative statement were correct, it still says nothing about trying or rejecting test assignments.

Therefore, claims 7 and 19 are independently patentable over the cited art, notwithstanding the patentability of independent claims 1 and 13.

VIII. The Section 103(a) Rejection of Claims 10 and 22

Appellant respectfully submits that even if independent claims 1 and 13 were conceded to be unpatentable over Rawat in view of Lee, the cited references still do not teach or suggest the added elements of dependent claims 10 and 22.

Claims 10 and 22 depend respectively from claims 9 and 21, which depend in turn from claims 1 and 13. Claims 10 and 22 recite that the labels are assigned to the fields by finding a plurality of alternative candidate assignments of all the labels to respective fields. The candidate assignments are then compared so as to unequivocally assign at least a subset of the labels to the respective fields.

In rejecting claims 10 and 22, the Examiner made reference to col. 7, lines 1-35, in Rawat. There is no mention or suggestion in the cited passage, or anywhere else in Rawat, of any sort of candidate assignment, let alone comparing a plurality of alternative candidate assignments, as recited in these claims. The Examiner stated (page 4, last paragraph, in the Official Action) that the dictionary could provide multiple label options, but even if this statement were correct, it still says nothing about comparing multiple candidate assignments.

Therefore, claims 10 and 22 are independently patentable over the cited art, notwithstanding the patentability of independent claims 1 and 13.

LX. The Section 103(a) Rejection of Claims 12 and 24

Appellant respectfully submits that even if claims 1 and 13 were conceded to be unpatentable over the cited art, the cited references still do not teach or suggest the added elements of dependent claims 12 and 24. These claims depend respectively from claims 11 and 23, which depend in turn from claims 1 and 13. Claims 12 and 24 recite that the labels are assigned to the fields by choosing an assignment that satisfies a statistical criterion with respect to satisfaction of the applicable rules by the contents of the fields in a plurality of form documents. In other words, claims 12 and 24 consider not just a single document, but rather apply a statistical criterion to the field contents in a group of documents in order to make the correct label assignment.

Claims 12 and 24 were rejected under 35 U.S.C. 103(a) over Rawat in view of Gupta, without reference to Lee. Gupta describes a method of automatically filling in on-line forms (abstract). He makes no mention of rules that may be applied to the filled-in contents. Furthermore, the Examiner conceded that “Rawat does not teach one or more rules applicable to the filled-in contents of the fields...” (page 3, lines 5-7, in the Official Action). Therefore, the cited references fail to teach or suggest all of the elements of claims 12 and 24, when these claims are read together with the base claims from which they depend.

Furthermore, even if Lee were to be considered together with Rawat and Gupta, the three references together still would not have led a person of ordinary skill in the art to use a statistical criterion in the manner recited in claims 12 and 24. Gupta contains no teaching or suggestion of any sort of statistical criterion, let alone a criterion that might be applied to satisfaction of a rule by field contents. There is similarly no such teaching or suggestion in Rawat or Lee.

Therefore, claims 12 and 24 are independently patentable over the cited art, notwithstanding the patentability of claims 1 and 13.

Summary

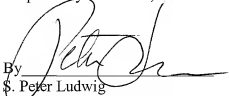
For the foregoing reasons, it is submitted that the Examiner's rejection of claims 1-30 was erroneous. Reversal of his decision is respectfully requested.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A. As indicated above, the claims in Appendix A include the amendments filed by Applicant on December 13, 2006.

Dated: August 6, 2007

Respectfully submitted,



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APPENDIX A

Claims Involved in the Appeal of Application Serial No. 09/740,733

1. A method for processing a document that includes a plurality of fields having respective contents that have been filled into the fields, the method comprising:

providing labels to be assigned respectively to the fields and one or more rules applicable to the filled-in contents of the fields according to the labels assigned thereto;

machine reading the respective contents that have been filled into the fields;

machine assigning the labels to the fields by testing the contents of the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules; and

extracting and arranging the contents in a database record, in which the contents of the fields are identified by the assigned labels.

2. A method according to claim 1, wherein the rules comprise a criterion to be applied to the contents of a single one of the fields.

3. A method according to claim 1, wherein the rules comprise a relation between the contents of two or more of the fields.

4. A method according to claim 3, wherein the contents comprise numbers, and wherein the relation comprises a mathematical relationship between the numbers contained in the two or more of the fields.

5. A method according to claim 3, wherein the contents comprise alphanumeric characters, and wherein the relation comprises a semantic relationship between words formed by the characters.

6. A method according to claim 1, and comprising providing one or more geometrical rules indicating an expected geometrical relationship between two or more of the fields according to the labels assigned thereto, and wherein assigning the labels to the fields comprises applying the geometrical rules along with the rules applicable to the contents of the fields.

7. A method according to claim 1, wherein assigning the labels comprises making a test assignment of the labels to the fields, and rejecting the test assignment if the contents of the assigned fields do not satisfy the rules applicable according to the labels.

8. A method according to claim 7, wherein making the test assignment comprises iteratively testing substantially all possible assignments of the labels to the fields, so as to find one or more candidate assignments for which the contents of the assigned fields satisfy all of the applicable rules.

9. A method according to claim 1, wherein assigning the labels to the rules comprises finding one or more candidate assignments of all of the labels to the respective fields, for which the contents of the assigned fields satisfy all of the applicable rules, and processing the contents of the fields responsive to the one or more candidate assignments.

10. A method according to claim 9, wherein finding the one or more candidate assignments comprises finding a plurality of alternative candidate assignments for which the contents of the assigned fields satisfy all of the applicable rules, and comparing the candidate assignments so as to unequivocally assign at least a subset of the labels to the respective fields. - - - -

11. A method according to claim 1, wherein the document comprises one of a plurality of form documents sharing a common layout, and wherein assigning the labels comprises making an assignment with respect to all of the form documents.

12. A method according to claim 11, wherein making the assignment comprises choosing the assignment so as to satisfy a statistical criterion with respect to satisfaction of the applicable rules by the contents of the fields in at least a subset of the plurality of form documents.

13. Apparatus for processing a document that includes a plurality of fields having respective contents that have been filled into the fields, the apparatus comprising a document processor arranged to receive a listing of labels to be assigned respectively to the fields and one or more rules applicable to the filled-in contents of the fields according to the labels assigned thereto, and further arranged to machine read the respective contents that have been filled into the fields and to machine assign the labels to the fields by testing the contents of the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules and to extract and arrange the contents in a database record, in which the contents of the fields are identified by the assigned labels.

14. Apparatus according to claim 13, wherein the rules comprise a criterion to be applied to the contents of a single one of the fields.

15. Apparatus according to claim 13, wherein the rules comprise a relation between the contents of two or more of the fields.

16. Apparatus according to claim 15, wherein the contents comprise numbers, and wherein the relation comprises a mathematical relationship between the numbers contained in the two or more of the fields.

17. Apparatus according to claim 15, wherein the contents comprise alphanumeric characters, and wherein the relation comprises a semantic relationship between words formed by the characters.

18. Apparatus according to claim 13, wherein the rules further comprise one or more geometrical rules indicating an expected geometrical relationship between two or more of the fields according to the labels assigned thereto, and wherein the processor is arranged to apply the geometrical rules along with the rules applicable to the contents of the fields so as to assign the labels to the fields.

19. Apparatus according to claim 13, wherein the processor is arranged to make a test assignment of the labels to the fields, and to reject the test assignment if the contents of the assigned fields do not satisfy the rules applicable according to the labels.

20. Apparatus according to claim 19, wherein the processor is arranged to iteratively test substantially all possible assignments of the labels to the fields, so as to find one or more candidate assignments for which the contents of the assigned fields satisfy all of the applicable rules.

21. Apparatus according to claim 13, wherein the processor is arranged to find one or more candidate assignments of all of the labels to the respective fields, for which the contents of the assigned fields satisfy all of the applicable rules, and to process the contents of the fields responsive to the one or more candidate assignments.

22. Apparatus according to claim 21, wherein the one or more candidate assignments comprise a plurality of alternative candidate assignments for which the contents of the assigned fields satisfy all of the applicable rules, and wherein the processor is arranged to compare the candidate assignments so as to unequivocally assign at least a subset of the labels to the respective fields.

23. Apparatus according to claim 13, wherein the document comprises one of a plurality of form documents sharing a common layout, and wherein the processor is arranged to make an assignment of the labels with respect to all of the form documents.

24. Apparatus according to claim 23, wherein the processor is arranged to make the assignment so as to satisfy a statistical criterion with respect to satisfaction of the applicable rules by the contents of the fields in at least a subset of the plurality of form documents.

25. A computer software product for processing a document that includes a plurality of fields having respective contents that have been filled into the fields, the product comprising a computer-readable medium in which program instructions are stored, which instructions, when read by a computer, cause the computer to receive a listing of labels to be assigned respectively to the fields and one or more rules applicable to the filled-in contents of the fields according to the labels assigned thereto, to read the respective contents that have been filled into the fields, and to assign the labels to the fields by testing the contents of the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules, and to extract and arrange the contents in a database record, in which the contents of the fields are identified by the assigned labels.

26. A method for computerized data processing, comprising:
receiving information that has been filled into a plurality of fields in a form on a computer;
providing labels to be assigned respectively to the fields and one or more geometrical rules indicating an expected geometrical relationship between two or more of the filled-in fields in the form according to the labels assigned to the fields;
assigning the labels to the fields by testing the information in the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules; and
extracting and arranging the information in a database record, in which the information that has been filled into the fields is identified by the assigned labels.

27. A method according to claim 26, wherein the form comprises a table, and wherein receiving the information comprises receiving characters keyed into the fields of the table by an operator.

28. Apparatus for data processing, comprising a form processor, which is arranged to receive information that has been filled into a plurality of fields in a form on a computer, and to receive a listing of labels to be assigned respectively to the fields and one or more geometrical rules indicating an expected geometrical relationship between two or more of the filled-in fields in the form according to the labels assigned to the fields, and to assign the labels to the fields by testing the information in the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules, and to extract and arrange the information in a database record, in which the information that has been filled into the fields is identified by the assigned labels.

29. A computer software product, comprising a computer-readable medium in which program instructions are stored, which instructions, when read by a computer, cause the computer to receive information that has been filled into a plurality of fields in a computerized form, and to receive a listing of labels to be assigned respectively to the fields and one or more geometrical rules indicating an expected geometrical relationship between two or more of the filled-in fields in the form according to the labels assigned to the fields, and to assign the labels to the fields by testing the information in the fields against the rules in order to find an assignment of the labels to the fields that satisfies the rules, and to extract and arrange the information in a database record, in which the information that has been filled into the fields is identified by the assigned labels.

30. A method according to claim 1, wherein the document is a paper document with a template preprinted thereon defining the fields, and wherein reading the respective contents comprises capturing an image of the document after the contents have been marked inside the fields defined by the template, and processing the image to extract the contents. - - - - -

APPENDIX B

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or entered by or relied upon by the examiner is being submitted.

APPENDIX C

No related proceedings are referenced in II. above, hence copies of decisions in related proceedings are not provided.